

REMARKS

Applicants appreciate the Examiner's thorough review of the present application, and respectfully request reconsideration in light of the preceding amendments and the following remarks.

Claims 24-27 and 32-38 are pending in the application. Claims 5 and 28-31 have been cancelled without prejudice or disclaimer. Claim 24 has been rewritten in independent form including all limitations of base claim 5, now cancelled. Claim 24 has been further amended to specifically define the claimed invention over the art. Claims 26-27 have been amended to depend on claim 24. No new matter has been introduced through the foregoing amendments.

The copy of the PTO-1449 attached to the Office Action does not include the Examiner's initials placed adjacent to the citations, namely, JP 2000-228537 and JP 2002-185039, a *legible copy* of each of which was submitted with the February 1, 2006 IDS with corresponding US abstracts (US 6,800,500 and US 6,939,729, respectively). Applicants respectfully submit that the IDS filed February 1, 2006 is *compliant* with 37 CFR 1.98(a)(2), and request that the above listed references be considered and a copy of the PTO-1449, with the Examiner's initial(s) placed adjacent to the citation(s) on the PTO-1449, be returned to Applicants' representative in the next office communication.

The new art rejections relying on *Okazaki*, *Akita* and *Chien* are noted. Although Applicants do not necessarily agree with the Examiner's proposed combination of *Okazaki*, *Akita* and *Chien* amendments have nevertheless been made to avoid the rejection solely for the purpose of expediting prosecution.

In particular, the broadest claim is now claim 24 which is directed to a GaN LED comprising, among other things, a reflective layer which has a "uniform thickness and covers the entire lower surface of the second conductive GaN clad layer, the reflective layer being in direct and

ohmic contact with the second conductive GaN clad layer throughout the entire lower surface of the second conductive GaN clad layer.”

The above added features find solid support in the application as filed. Specifically, Fig. 2 and the corresponding text in the specification of the instant application disclose a reflective layer (22) which has a uniform thickness and covers the entire lower surface of the second conductive GaN clad layer (25a), the reflective layer (22) being in direct and ohmic contact (page 13, line 13) with the second conductive GaN clad layer (25a) throughout the entire lower surface of the second conductive GaN clad layer (25a). The reflective layer (22) forms ohmic (not Schottky) contact with the second conductive (p-type) GaN clad layer (25a) throughout the entire lower surface of the p-type GaN clad layer (25a), since current can flow through the reflective layer (22) covering and directly contacting with the entire lower surface of the p-type GaN clad layer (25a).

The applied references, especially *Chien*, fail to disclose or suggest the above features of claim 24. In the embodiment of *Chien* that is relied upon by the Examiner,¹ the reflective layer 156 covers only a portion of the lower surface of the p-type GaN layer 155. As a result, *Chien*'s reflective layer 156 is in direct and ohmic contact, if at all, with the p-type GaN layer 155 through only that portion of the lower surface of the layer 155. See, e.g., element 156 in Fig. 9e of *Chien* which has a “central hole.” In the other embodiments of *Chien* not relied upon by the Examiner, the reflective layer 135, 145, 201 has a gap (Figs. 7d, 8d, 10c) or a Schottky contact (125, Fig. 6f) for forming a current-block region. See *Chien* at column 5, lines 57-59, and column 6, lines 32-34. Due to the presence of such gap or Schottky contact, the *Chien* reflective layer (125, 135, 145, 156, 201) does not have a uniform thickness, contrary to the claimed invention.

Therefore, in order to form *Chien*'s reflective layer, complex patterning and etching processes are needed (see, e.g., Figs. 6a-6c, 7a-7c, 8a-8c, 9a-9c, 10a-10b). In contrary, the LED of claim 24 can be manufactured by a simple process, e.g., by forming a reflective layer with a

uniform thickness covering the entire lower surface of the p-type GaN clad layer as disclosed in the specification and drawings as filed.

Further, the *Chien* gap in the reflective layer 156 between layers 155 and 157 will decrease the layer's reflectivity. See, e.g., Fig. 9e of *Chien*. Since light emitted by the active layer 132 is reflected by the gap under the total internal reflection conditions, the gap can only reflect incident light with an angle of incidence smaller than the critical angle. In addition, the smaller the angle of incidence, the poorer the reflectivity of the gap. See, e.g., *Chien* at Fig. 7d, column 6, lines 34-43, and Fig. 9e, column 7, lines 31-34. In contrast, a reflective layer that covers the entire lower surface of the second GaN clad layer reflects any incident light with any angle of incidence throughout the entire lower surface area of the second GaN clad layer, thereby ensuring superior reflectivity of the claimed LED as compared to *Chien*.

For the overwhelming reasons discussed above, Applicants respectfully submit that amended claim 24 is patentable over the applied art of record.

Claims 25-27 and 32-38 depend from claim 24, and are considered patentable at least for the reasons advanced with respect to claim 24.

As to claims 32 and 36, Applicants respectfully disagree with the Examiner's position that *Chien* teaches the claim feature that "the reflective layer is in direct contact with both the second conductive GaN clad layer and the conductive adhesive layer." *Chien* teaches, at best, direct contact of reflective layer 156 with substrate 157, rather than with a conductive adhesive layer. If the Examiner considers *Chien*'s layer 157 as "a conductive adhesive layer," then reflective layer 156 is not in direct contact with the second conductive GaN clad layer 154, contrary to the requirement of claims 32 and 36. Accordingly, the rejection of claims 32 and 36 is improper and should be withdrawn.

¹ See Office Action at page 4, line 7 from bottom.

Each of the Examiner's rejections has been traversed. Accordingly, Applicants respectfully submit that all claims are now in condition for allowance. Early and favorable indication of allowance is courteously solicited.

The Examiner is invited to telephone the undersigned, Applicant's attorney of record, to facilitate advancement of the present application.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 07-1337 and please credit any excess fees to such deposit account.

Respectfully submitted,

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